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January 16, 2007

Ms. Gail Carmody
Supervisor
United States Fish and Wildlife Service
1601 Balboa Ave
Panama City, Florida 32405-3721

Colonel Peter F. Taylor, Jr.
Department of the Army
Mobile District, Corps of Engineers
Attention: CESAM-DE
Post Office Box 2288
Mobile, Alabama 36628-0001

RE: Comments on Reasonable and Prudent Measure No. 3 (Drought Provisions)

Dear Ms. Carmody and Colonel Taylor:

The U.S. Fish and Wildlife Service ("FWS" or the "Service") issued its *Biological and Conference Report on the U.S. Army Corps of Engineers, Mobile District, Interim Operating Plan for Jim Woodruff Dam and the Associated Releases to the Apalachicola River* ("BiOp") on September 5, 2006. The BiOp provided the U.S. Army Corps of Engineers ("Corps") an incidental take statement for the taking of mussels in the Apalachicola River. BiOp at 140-147. Among the reasonable and prudent measures ("RPM") contained in the incidental take statement is "RPM 3 Drought Provisions." The question presented by RPM 3 is whether, and under what conditions, the Corps can provide a higher flow floor than 5,000 cubic feet per second ("cfs") in the Apalachicola River. Our analysis indicates that the Corps unquestionably can provide higher flow floors ranging from at least 5,700 cfs in the driest years up to at least 6,300 cfs under normal conditions.

To be clear, Florida remains dissatisfied with many facets of the IOP and has challenged the BiOp in the U.S. District Court for the Northern District of Florida. *State of Florida v. U.S. Fish & Wildlife Serv.*, 4:06 CV 410 RH-WCS 9 (N.D. Fl.). The following comments are not intended to condone or validate the IOP or the BiOp, but are offered simply to answer the narrow question presented by RPM 3 in accordance with the invitation

extended by your agencies. Florida's analysis assumes continuation of the IOP in its current form solely for the limited purpose of demonstrating the Corps' ability to raise the flow floor under the IOP. The results of our analysis and methodologies employed are set forth in detail below. Neither our analysis, nor our conclusions, constitute a "Florida proposal" of any kind. Rather, they reflect a simple demonstration of the Corps' capability to augment flows for the mussel species and habitats of concern within the limited context of RPM 3.

I. Background

RPM 3 requires the Corps to "[d]evelop modifications to the IOP that provide a higher minimum flow to the Apalachicola River when reservoir storage and hydrologic conditions permit." BiOp at 142. The BiOp explains that "available data indicates that higher minimum flows are supportable during normal and wet hydrologic periods, and during dry periods when the reservoirs are relatively full." *Id.* Measures like RPM 3 are implemented through compliance with mandatory "terms and conditions." 16 U.S.C. § 1536(b)(4)(iv); 50 C.F.R. § 402.14(i)(1)(iii). The Corps' incidental take statement contains among its terms and conditions a requirement that the Corps "with Service concurrence, shall initiate by January 30, 2007, IOP drought provisions that identify the reservoir, climatic, hydrologic, and/or listed species conditions that would allow supporting a higher minimum flow in the Apalachicola River, and that identify recommended water management measures to be implemented when conditions reach the identified drought trigger point(s)." BiOp at 144. The Corps must implement the RPMs and terms and conditions enumerated in the incidental take statement to maintain authority to take mussels in the Apalachicola River. *See, e.g.*, 16 U.S.C. § 1536(b)(4)(ii); 16 U.S.C. § 1536(o)(2); 50 C.F.R. § 402.14(i)(1)(ii). Thus, it is not a question of whether the Corps must comply with RPM 3, but how.

Florida extended an invitation on December 8, 2006 to Corps and FWS personnel to meet with Florida's modeling team and discuss the opportunity presented by RPM 3. By electronic mail dated December 18, 2006 from Brian Zettle of the Corps, your agencies regrettably declined Florida's invitation. You, nevertheless, indicated that you would accept any information on the subject that Florida desired to submit. The Service, moreover, has explained it will consider relevant information at any time.[1] Please consider these comments Florida's response to these invitations.

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[1] *See Interagency Cooperation – Endangered Species Act of 1973, as Amended, Final Rule*, 51 Fed. Reg. 19,926, 19,950 (June 3, 1986) ("We [FWS] believe that information could become available at any

II. Observations About Concepts Presented at the December 13, 2006 Workshop.

Your agencies held a workshop concerning RPM 3 in Columbus, Georgia on December 13, 2006. Florida was not able to actively participate in the workshop, but did attend and review the Corps' (and others') presentations. Florida makes the following observations about the Corps' effort to comply with RPM 3 as described at the Columbus workshop.

The IOP allocates Basin Inflow among consumptive uses, storage and instream flows (mussels, sturgeon, etc). All upstream consumptive demands are implicitly met without restriction.[2] The remainder is then distributed between storage and release. Contrary to the import of RPM 3, the Corps' presentation makes clear that the Corps intends to retain 5,000 cfs as the flow floor and allocate even more Basin Inflow during the spring to storage. The Corps then specifies that a flow of 6,500 cfs could be maintained until composite reservoir storage reaches the top of Zone 3. Thereafter, until composite storage is refilled to Zone 1, the flow would be kept at 5,000 cfs. This approach does not satisfy the goal of RPM 3, which is to provide more – not less – water to the Apalachicola River.

The Corps' suggestions for RPM 3 reflect much modeling, but very little hydrologic analysis. There are four fundamental problems with the Corps' suggestions: 1) They are based entirely on conditions that have already occurred or very near term (7-day) projections; thus they all are reactive rather than proactive; 2) they make no distinction between wet and dry seasons; 3) they never allow for drafting of storage for the benefit of mussels, except at 5,000 cfs; and 4) they are based on the premise that 5,000 cfs results in an acceptable flow level, which, again, contravenes RPM 3.

Finally, it appears the Corps is placing considerable weight on the droughts of 1981, 2000 and shorter duration dry conditions experienced in 2006. In any analysis of RPM 3 alternatives, it must be recognized that both the 2000 and 2006 adverse hydrologic conditions were significantly, and unnecessarily, exacerbated by the Corps. In late April and early May of 2000 the Corps conducted a navigation window. Approximately 200,000 acre-feet of water was released for that purpose, equivalent to

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time during the consultation, and such information should be submitted to the Service for its consideration.").

[2] As a consequence, the Apalachicola River unfairly bears the full burden of decreased Basin Inflow attributable to increasing Georgia demands. Georgia's demands cannot be allowed to grow unchecked without account for the impact of that growth on downstream interests.

an average continuous release of at least 7,200 cfs for the two week period. In 2006, due to a gage error that persisted for almost 2 months, the Corps unknowingly released 76,000 acre-feet of storage from Lake Lanier over and above intended amounts. This was equivalent to a continuous average release of 650 cfs over the 59 day period and occurred during the dry season.

In short, the level of Lake Lanier dropped much further than it should have in both 2000 and 2006. In each case, through modified operations and increased diligence, reservoir levels throughout the ACF Basin could have been much higher, and more water could have been made available downstream. Indeed, the Corps has publicly committed to discontinue its use of navigation windows.[3] Thus, when predicting future reservoir elevations that might result from implementing RPM 3, it should be assumed that the Corps will not repeat its errors of the past, and that more water will be available to meet downstream flow requirements.

III. Higher Flows Need Not Be Provided at the Gulf Sturgeon's Expense

At the December 13, 2006 workshop, one or more presentations made by the Corps and Georgia involved conserving additional water during the spring riverine fish spawn with the apparent intent of making that increment of stored water available later during the year in furtherance of augmented mussel-related flows.[4] The problem with this approach is twofold: First, there is no basis in the BiOp from which to conclude that the Gulf sturgeon can tolerate even less water than is provided under the IOP during the spawn. Second, the approach entirely ignores the fact that reduced floodplain inundation during the spring will compromise the health and productivity of fish species that act as reproductive hosts for the mussels, themselves.

A. The Current Proposals are Bad for the Gulf Sturgeon

Georgia and the Atlanta Regional Commission (ARC) have proposed to further reduce Apalachicola River flow during Gulf sturgeon spawning. Georgia's and ARC's recommendations were based on an assumption that adequate sturgeon spawning habitat would be provided at a flow of 10,000 cfs when total inundated acres of river

[3] Letter dated March 7, 2006 from Col. Taylor to Gail Carmody (initiating ESA Section 7 consultation) at 5-7.

[4] It did not go unnoticed that Georgia's proposal, notably, stopped at the point of storing additional water during the spring, but never actually explained how – or if – the additional storage would be used for the benefit of the mussels.

bottom were combined for the two documented spawning sites. Figures 3.6.1.4.C and 3.6.1.4.D of the BiOp were referenced to validate the recommendation. Using the combined two-site (RM 99 + RM 105) acreage inundation, as Georgia and ARC propose, does not recognize the spawning substrate requirements for successful Gulf sturgeon reproduction.

Gulf sturgeon research and literature demonstrates that rough limestone bottom is essential for successful sturgeon spawning, egg development, and larval survival. The arguments presented by Georgia and ARC make the erroneous assumption that smooth consolidated clay bottom provides suitable habitat for successful spawning and early development of Gulf sturgeon. Sturgeon eggs have been collected one time at river mile (RM) 99 where clay bottom exists, but no evidence is available to demonstrate that clay bottom supports successful egg development and larval survival. The occurrence of eggs at RM 99 may or may not have biological importance. The rough limestone spawning site at RPM 105 appears to be the primary sturgeon spawning location on the Apalachicola River and provides a range of flow velocities suitable for sturgeon spawning and egg attachment over a wide range of river flows. Simply put, RM 99 is not the habitat equivalent of the rough limestone spawning site at RM 105 where egg collection success was 10 times greater than that of RM 99 in 2006. The one time collection of nine eggs at RM 99 cannot reasonably justify a three-fold reduction in Apalachicola River flow during the spring spawning season.

The Service previously explained the importance of preserving essential Gulf sturgeon habitat components, stating "spawning habitats should receive maximum protection from disturbance[,]" and that, more specifically, "protection of spawning habitats of the Apalachicola River would include the upper 20 km (12.4 mi) of the river and its surrounding basin components."[5] This area later was designated as part of critical habitat "Unit 6."[6] Current proposals that take yet more water from these areas during the spawn cannot be justified biologically.

B. The Current Proposals are Bad for the Mussels

The Apalachicola River mussels rely entirely on host fish for reproduction. The importance of the host-fish connection is documented in the BiOp. *See, e.g.*, BiOp § 2.2.3.3. (Reproduction); *id.* § 3.3.3. (Seasonality) ("The habits of many fish species, some

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[5] U.S. Fish and Wildlife Service, *Gulf Sturgeon Recovery/Management Plan* (1995) at 51.
[6] 68 Fed. Reg. at 13,393.

of which may serve as hosts for the listed species, are seasonal and flow dependent (Angermeir 1987; Schlosser 1985). We discussed the importance of floodplain inundation as spawning and rearing habitat for fishes in the previous section."); *id.* § 3.6.2.3 (Permanently Flowing Water) ("This constituent element is also necessary for host fishes that spawn in the floodplain. According to Light et al. (1998; 2006) and analyses presented in this Biological Opinion (see section 3.3 Flow Regime Alterations), the frequency and duration of main channel-floodplain disconnections has increased over time, and these disconnections are exacerbated by low flows associated with droughts and controlled water releases (Walsh et al. 2006)."); *id.* § 3.6.2.5 (Fish Hosts) ("Although the three mussels are not generally found in floodplain habitats, their host fish species are likely to use floodplain habitats, and, as previously mentioned, mussel population viability is likely dependent on fish host population density.").

More than 80% of the freshwater and anadromous fish species found in the River spend a portion of their life cycle in the floodplain.[7] The area of available fish and wildlife habitat, however, has been reduced dramatically over the previous five decades.[8] For example, the United States Geological Survey ("USGS") has concluded it now takes over 10,000 cfs more water in the upper River to inundate the same amount of habitat available in the pre-dam era at a flow of 15,000 cfs.[9] In addition, there has been a decrease in the duration of floodplain inundation, particularly at lower discharges. "As a consequence of this decreased inundation, the quantity and quality of floodplain habitats for fish, mussels, and other aquatic organisms has declined, and wetland forests of the floodplain are changing in response to drier conditions."[10]

Taking additional water from these key floodplain habitats during the spring will not only further imperil the Gulf sturgeon, but will also compromise the spawn of multiple fish species, many of which play host to threatened and endangered mussels.

IV. A Better Approach is Available

Rather than accepting a 5,000 cfs flow floor, as the Corps continues to do, Florida's goal was to specify conditions under which flows at Chattahoochee could be maintained at

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[7] U.S. Geological Survey, *Water-Level Decline from 1954 to 2004 in the Apalachicola River, Florida, and Effects on Floodplain Habitats* (Aug. 2006) at 1.
[8] USGS 2006 at 1.
[9] USGS 2006 at 22.
[10] USGS 2006 at 1.

not less than 6,300 cfs.[11] Florida also set out to better identify what flows could be provided if 6,300 cfs could not be attained due to perceived limitations on storage. Our desire was to develop an objective set of predictive conditions that could be used to implement an appropriate flow floor. There are many perturbations of the following framework. The important elements, however, are to: 1) Maximize refilling of Lake Lanier in the less biologically significant months of December, January and February, 2) draft from storage as needed to meet revised (i.e., higher) flow floors, and 3) rely on the volume of Basin Inflow in the January – March timeframe to determine the appropriate flow floor for the year.

A. Early Year Basin Inflow Can Be a Key Predictive Tool

It is critical to anticipate accurately whether dry conditions will persist throughout a given year when rainfall or Basin Inflow is below normal in the January - March period. We examined the reliability of using flows in January - March as a predictor for the remainder of the year.[12]

The monthly distribution of inflow in the Chattahoochee Basin and at Seminole is very homogeneous. On average over the entire basin and at each of the reservoirs, approximately 50% of the total Basin Inflow is received from January through April. At Lanier, West Point, Walter F. George and Seminole, the local inflows during January to April are 48%, 52%, 59% and 50% of the total yearly inflow, respectively.. Roughly 36% to 46% of the total is received in January to March. **Figure 1** illustrates the cumulative monthly inflow at each of the four federal reservoirs. These distributions are very similar, indicating that average inflows at one location correlate very well with inflows at other locations. Inflows are also spatially similar under low flow conditions.

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[11] Florida has explained the biological relevance of the 6,300 cfs flow numerous times, *see, e.g.*, Letter dated August 18, 2006 from Secretary Castille to Gail Carmody (comments on the BiOp), and will not reiterate that discussion here. Florida notes, however that some have incorrectly intimated that such a flow is relevant only to Swift Slough. The benefits afforded Swift Slough at this flow accrue in many other areas, including the mainstem channel margins from NM 43 to NM 44, Hog Slough, Moccasin Slough, and the unnamed Brushy Creek Feeders. Each contains significant mussel resources or habitat, and all of these areas were unnecessarily impacted in 2006 due to dewatering or elevated water temperatures in the shallows.

[12] Another predictive measure of near-term drought should be added separate from the January - March inflow. NOAA makes 3-month and 6-month projections that are fairly accurate. Based on a cursory review, it appears the accuracy of these projections for drought is on the order of 60-70%.

At the December 13 workshop, the Corps distributed graphs showing the inflow to each federal reservoir for the 1981 and 2000 droughts. **Figures 2a and 2b** illustrates the distribution of inflows for these years at each of the federal reservoirs. Under average and low flow conditions, there is a strong spatial correspondence between flows in different parts of the basin. We can expect, therefore, that conditions in one part of the basin will be reflected in the remaining areas of the basin.

Florida also analyzed the temporal variation in flow to determine if conditions early in the year (January to March) were a reliable predictor of conditions for the remainder of the year. **Figure 3** illustrates the quarterly observed flows at the Chattahoochee gage for the period 1939 to 2005 expressed as the ratio to the quarterly average flow. For example, if the observed value is identical to the average, the ratio will be exactly 1 (i.e., the observed flow is 100% of the average). Values less than 1 are instances in which below average flow was observed. Values greater than 1 are instances in which the observed flow is greater than the long-term average.

No drought years occurred if the flow at the Chattahoochee gage was 90% or above of the 67 year mean in January – March period. Of the 67 year period of record, 39 years (58%) had January - March flows of at least 90% of the average **(Figure 4)**. None of these is considered a dry or drought year. Even in these years, however, there is a very high probability (80%) that flow at the Chattahoochee gage will be less than average in at least one quarter. This simply means that below normal flows will occur for a short period in most all years (e.g., 2006). These short duration events should be expected and should not lead to curtailment of reservoir releases if the January - March flows were strong and near term climate predictions do not indicate persistent dry conditions over the next 3 to 6 months. Since these short-duration events will occur most every year, it follows that water should be stored at least during the January - February period to provide augmentation when the almost inevitable dry period occurs later in the year. Since this is the wet season, storage during this period should have little relative impact on flows at the Chattahoochee gage.

In contrast, if the January – March flow is only 55% of normal or less, then there is a very high probability that severe drought and low flow conditions will occur during the dry season. This condition occurred in 10 of the 67 years (**Figure 5**). All the most severe droughts of record occurred in years in which the January - March flows were 37% to 55% of normal (Figure 4). This condition occurred in 1981, 1999, 2000 and 2002 without

exception. Earlier in the record, this condition also occurred in 1941, 1951, 1955 and 1956. Similarly, these were all drought years.[13]

Of the remaining 18 years in which the January - March flow at Chattahoochee was between 55% and 90% of normal, 12 were years that were not persistently dry (**Figure 6**), and in which there were no operational problems, abnormally low reservoir levels or low flows at the state line. The remaining 6 years include 1950 and 1954 (pre-reservoirs), 1968, 1986, 1988, 2001 and 2004. These were dry years, but did not result either in severe low flows for an extended period of time or low levels at Lanier.

From the above it is evident that flow in the January - March period can be used with reasonable accuracy to anticipate conditions for the remainder of the year. In sum:

- If flow at the Chattahoochee gage from January - March is 90% of average or greater, there is essentially a zero probability that the year will be a drought year.

- If flow at the Chattahoochee gage from January - March is 56% to 89% of the average, there is a 33% chance that persistently dry conditions (i.e., less than 90% of average at Chattahoochee) will continue for the remainder of the year.

- If flow at the Chattahoochee gage from January - March is 55% of average or less, there is a high probability that drought conditions have already started and will continue for the remainder of the year. There is also a high probability that conditions will be severe and that flows and reservoir levels will be impacted.

If the Corps is to implement successfully RPM 3, it must fundamentally change its operational penchant for assuming worst-case future hydrology scenarios when Basin Inflow merely is reduced in the short-term. Simply put, as dry conditions develop, the Corps invariably assumes that an extraordinary drought will develop for the remainder

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[13] As with any such analysis, the results are not exactly as predicted. There were two "drought" years which did not have a severely dry first quarter. These are 1954 and 1986. Neither of these was any more severe than dry years such as 1988. There were also two years in which the January - March flows were at or below 55% of normal but the year was not a severe drought year. These are 1957 and 1989 both of which were dry years but not severe drought years.

of the year. In 2006, for example, as low Basin Inflow began to be observed, the Corps responded by curtailing releases as if a 2000 drought scenario were in place. The January - March flows for 2006, however, were 75% of normal, and hydrologic conditions during 2006 never approached those experienced in 2000. Curtailing releases and reducing flows at Chattahoochee based solely on such faulty assumptions will always result in a higher level of mussel mortality than is necessary and empirically is unjustified.

B. Municipal and Industrial Intakes at Lake Lanier May be Protected

The Corps operates Lake Lanier during dry periods principally to protect water supply. *See, e.g.*, 1989 Draft Water Control Plan at A-2. Setting aside, for the moment, what Florida perceives as the illegality of that decision, Florida understands that the M&I water supply intakes of various entities who withdraw water from Lake Lanier are located at approximately elevation 1,045'. *Final Environmental Impact Statement for the Operation and Maintenance of Lake Lanier* (2003) at 2-39 ("Below 1,045 feet pumps must be operated at lower capacity to prevent a whirlpool effect, which could damage pumping equipment.") Solely for the limited demonstration contained herein, and without accepting its legitimacy, a minimum elevation of 1,048' is assumed to be acceptable.[14]

Lake Lanier is the most important of the federal reservoirs for augmentation purposes, since it represents approximately two-thirds of the total basin storage. Therefore, Florida examined whether sufficient storage has traditionally been available to augment flows at Chattahoochee when needed. The average elevation of Lake Lanier was computed on a quarterly basis for the period 1960 to 2006 (1960 was the first year that Lanier was at full pool for an entire quarter). **Figure 7** illustrates the quarterly elevations for each year. There are 10 years in which the quarterly average elevation of Lake Lanier was 1,060' or less. Interestingly, only 4 of the 10 years were drought years. These are 1981, 1986, 1988 and 2000. The remaining years in which the Lake Lanier elevation was 1,060' or less were not drought years, suggesting some non-drought-related operational decision was made that reduced the lake elevation. In droughts of the magnitude of the year 2000, the level of Lake Lanier will drop below 1,060', but it has never approached a critical level of 1,048'.

C. A Hypothetical RPM 3 in Practice.

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[14] For our purposes, consistent with the Corps' historical practice, the minimum level at West Point and Walter F. George is the bottom of those reservoirs' respective conservation pools.

Based on the foregoing, Florida believes that the following predictive measure could be used by the Corps to implement RPM 3, while protecting a Lake Lanier elevation of 1,048':

1. In January and February, preferentially store water in Lake Lanier. Allocate Basin Inflow above Buford between storage and minimum required releases (+/- 850 cfs). Refill to the top of the conservation pool (1,071). Retain the release schedule from the IOP for Basin Inflow below Buford.

2. In March, draft storage as necessary to support a flow floor of 6,300 cfs at Chattahoochee (which never has occurred in the entire period of record). At higher Basin Inflow operate as provided in the IOP.

3. On April 1, 2006, check aggregate January – March Chattahoochee flow and set the mussel-related flow floor for the year as noted in Table A below. At higher Basin Inflow operate as provided in the IOP.

Table A: Possible Alternative Flow Floors

January – March Flows as a percentage of long-term avg.	Applicable flow floor at the Chattahoochee Gage
90% or greater	6,300 cfs
56% - 89%	6,000 cfs
55% or less	5,700 cfs

D. Model Results

Florida has modeled the scenario just described against the 1981 and 2000 droughts, as well as the full range of historic flows. The release rules and new floors at the Chattahoochee gage described above were used to simulate the period from 1939 – 2002. Demands were set at levels recently provided by Georgia for municipal and industrial use and agricultural withdrawals.[15] The IOP releases were used at higher

[15] Because these amounts were provided to Florida in the context of the ongoing mediation in State *of Alabama v. United States Army Corps of Engineers*, CV-90-H-01331-E (N.D. Ala.), they are

levels of Basin Inflow. Inflow to Lake Lanier in excess of 850 cfs in January and February was retained in storage. This curtails hydropower releases and production except when Lanier is at 1,071'. For modeling purposes only, the minimum level of Lanier was set at an elevation of 1,048'. The levels of West Point Lake and Lake W.F. George were allowed to reach the bottom of the conservation pool without restriction.

With the above operating rules and demands, the minimum daily flow at the Chattahoochee gage is at least 5,700 cfs on all days (100%). Most of these occurrences were in the simulated equivalent of 1941, 1955, 1981, 1986, 1999 and 2000. These are all years in which the January – March Chattahoochee flow was at or below 55% of normal. Therefore, even during the critical periods, a minimum of 5,700 cfs can be maintained at Chattahoochee. Moreover, a daily Chattahoochee flow of 6,300 cfs occurred 95% of the time.

The simulated minimum Lanier elevation is 1,050.49'. Notably, Lake Lanier is at or above 1,051' in all but 10 days out of the 63 year period and at or above 1,052 for all but 84 days. At higher Basin Inflow values, the flow at the Chattahoochee gage is at or above the minimum values listed in the IOP. All Georgia demands are met. There is some impact on flood storage in Lake Lanier resulting from the preferential refilling in January and February. The minimum daily elevation of Lake Lanier occurred in the simulated equivalent of 2000. The minimum daily simulated elevations for 1981, 1986, and 1999 are 1,058.12, 1,058.82 and 1,062.87, respectively.

Figures 8 and 9 illustrate the simulated daily flows at the Chattahoochee gage and the elevation of Lake Lanier. These are expressed as simple probabilities.

E. Lessons from 2006

As noted above, January - March Chattahoochee flows for 2006 were 75% of normal. Thus, under the terms described above, a flow floor of 6,000 cfs would have been provided at all times. The ease with which this could have been accomplished is demonstrated by a brief reflection on actual conditions experienced in 2006, a year in which a flow floor of 6,300 cfs was easily achievable.

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not disclosed here. These demands represent current upstream consumptive uses, *i.e.*, reductions in Basin Inflow. To the extent Georgia's demands increase, the projections set forth herein may be affected. However, Florida cannot be compelled to bear the burden of additional reductions in Basin Inflow.

During 2006 there were a total of 62 days in which flow at the Chattahoochee gage was less than 6,300 cfs. Augmenting downstream flows to increase all 62 days to 6,300 cfs would have required 98,241 acre-feet of water. Assuming that 100% of this total was drafted from Lake Lanier, with a starting elevation of 1,065', the required augmentation releases would have caused a decline of approximately 2.8' in the elevation of Lake Lanier. The lowest elevation of Lake Lanier this past summer was approximately 1,061'. Even with augmentation releases to support 6,300 cfs at Chattahoochee, Lanier would have declined only to 1,058'.

Finally, recall that the Corps lost approximately 2.5' in Lanier as a result of its gage error last year. If the Corps had not over-released during that time, but instead supported the 6,300 cfs in July and August, the Lanier elevation would be at approximately the same elevation it is today, or 1,063'. As a practical matter, therefore, reservoirs would not have been impacted at all by augmentation flows during 2006. On the other hand, literally thousands of threatened and endangered mussels likely would have survived, had the Corps been willing to accept modest, temporary declines at Lake Lanier.

IV. Conclusions

The Corps previously committed to maintain a hydrologic connection between the main channel of the River and key mussel habitats like Swift Slough.[16] Although that connection may have been available previously at a flow of 5,000 cfs, such flow simply no longer suffices to maintain the critical connections that are necessary to minimize mussel mortality.[17] Nevertheless, the foregoing demonstrates that the Corps can provide a higher flow floor in the Apalachicola River. In the majority of years, the Corps can provide at least 6,300 cfs, and at least 5,700 cfs even under the most dire circumstances, with proper operational forethought. This can be accomplished even within the context of the IOP and without compromising M&I water supplies at Lake Lanier.

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[16] U.S. Fish and Wildlife Service, *Recovery Plan for Endangered Fat Threeridge, Shinyrayed Pocketbook, Gulf Moccasinshell, Oval Pigtoe and Threatened Chipola Slabshell, and Purple Bankclimber* (2003) at 88 (discussing Corps' assurance that 5,000 cfs would maintain a connection between the River and Swift Slough).

[17] *See* Letter dated July 13, 2006 from Marian Berndt to Jerry Zietwitz (Attachment A – *Apalachicola River discharges needed to maintain flowing conditions in Swift Slough*).

It is incumbent on FWS to ensure that the Corps' incidental take statement includes measures "necessary or appropriate to minimize" the impact of take, 16 U.S.C. § 1536(b)(4)(C)(ii) (emphasis supplied). Had the Corps been utilizing a realistic, predictive approach to water management in 2006, a floor of at least 6,000 cfs could have been maintained in the Apalachicola River at all times. Observed mussel mortality, which was 2 – 4 times the natural rate in 2006,[18] would have been dramatically reduced. The ESA requires no less.

Florida appreciates the opportunity to provide this information and looks forward to seeing its incorporation into your decision. Should either of your agencies have any questions about this analysis or Florida's conclusions, do not hesitate to contact me.

Sincerely,

Michael W. Sole
Secretary-Designee

MWS/tw

[18] BiOp at 78-79.

Figure 1-- Average Cumulative Percent Inflow (approximate)

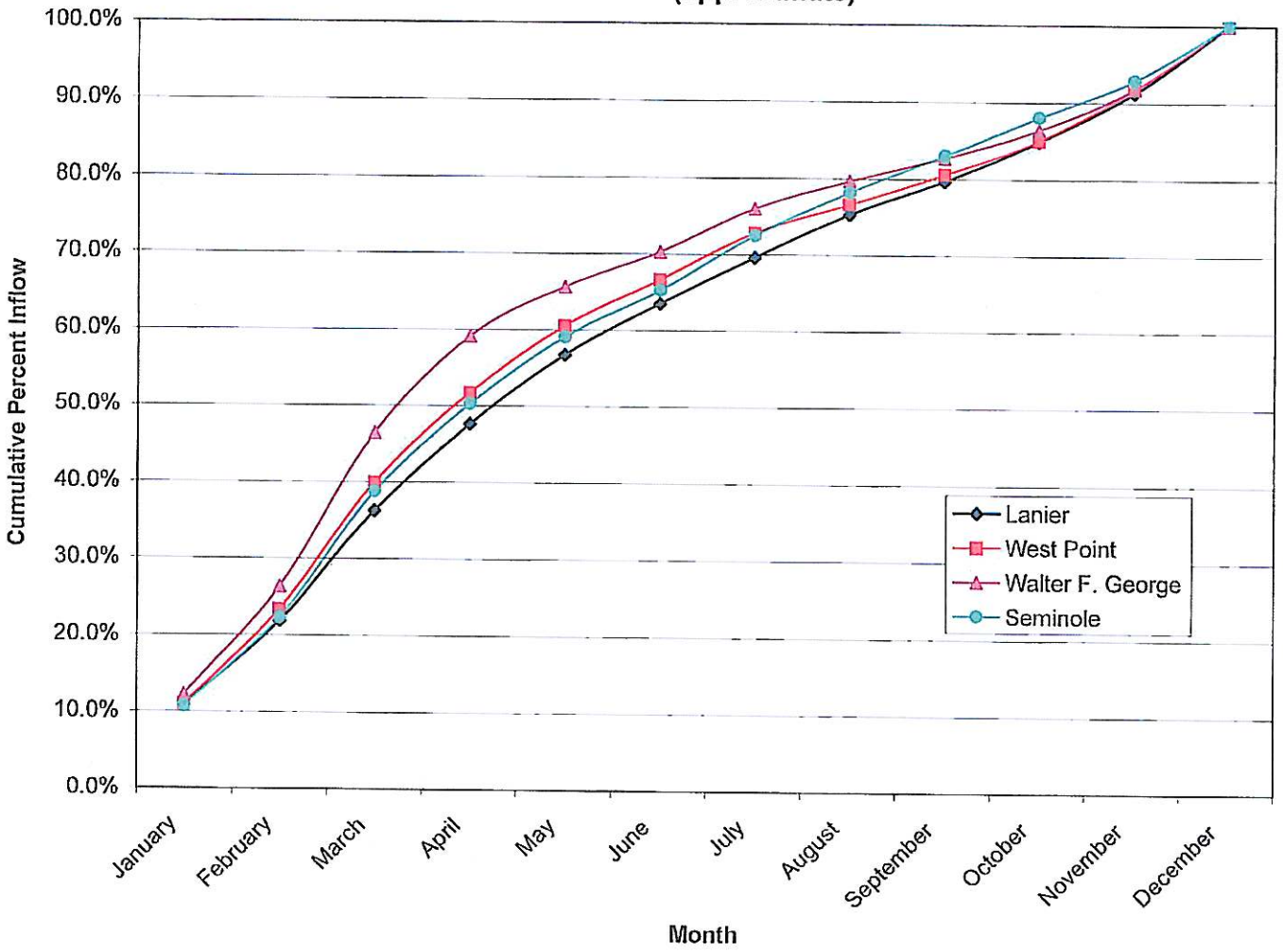

Figure 2a -- Monthly Inflow to Federal Reservoirs in 2000

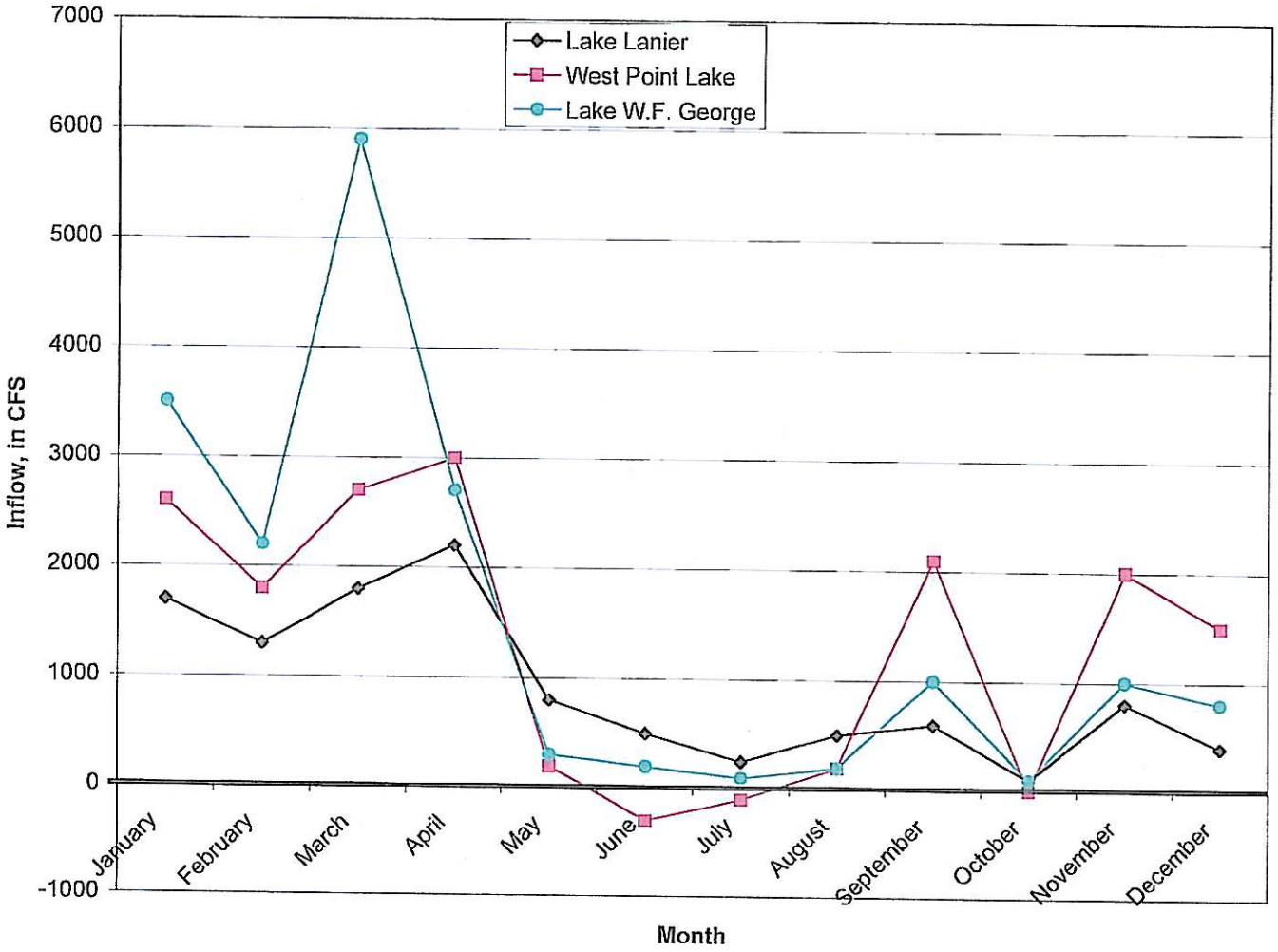

Figure 2b--Monthly Inflow to Federal Reservoirs in 1981

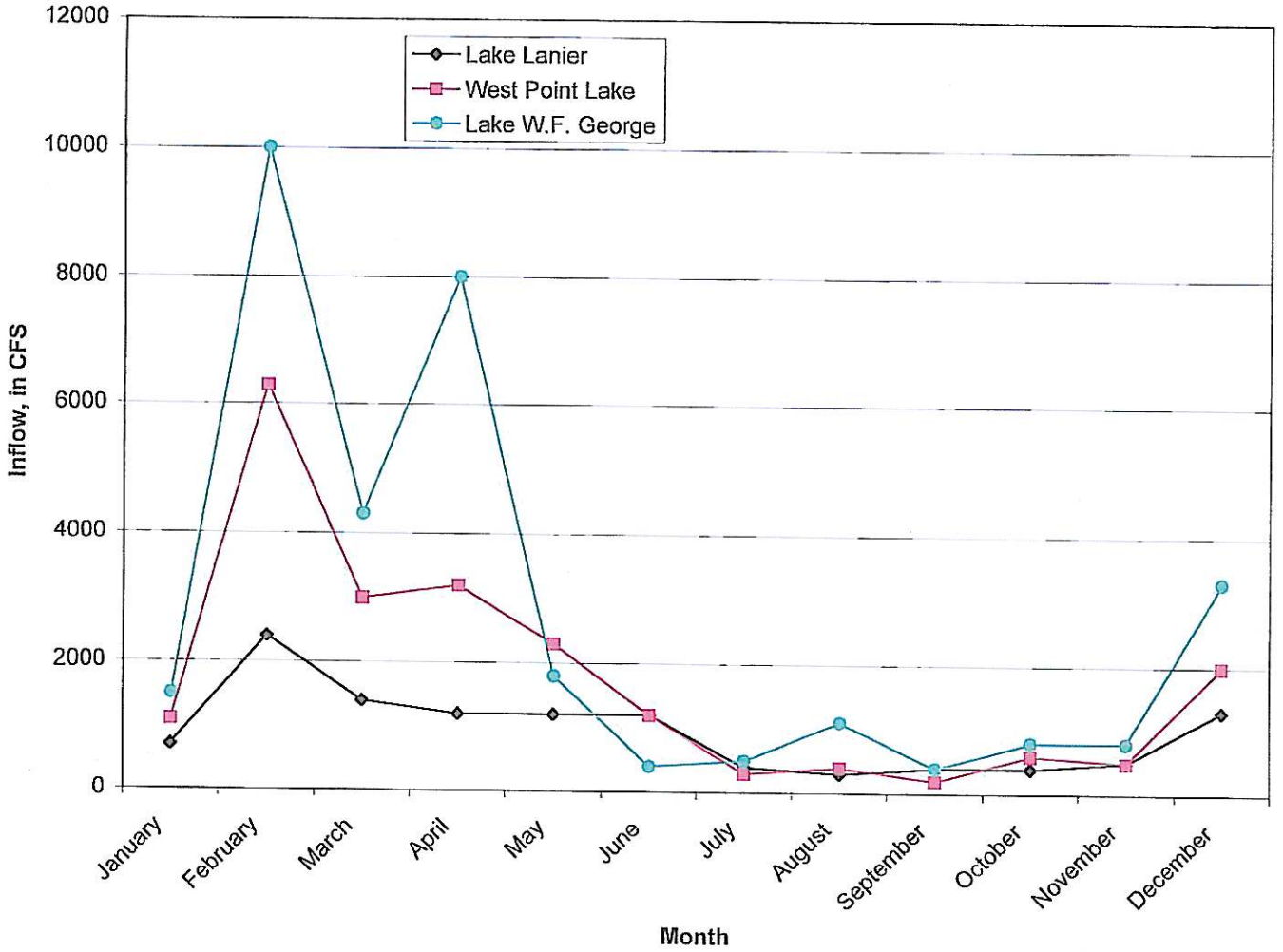

Figure 3--Quarterly Flow at the Chattahoochee Gage by Year for 1939-2006

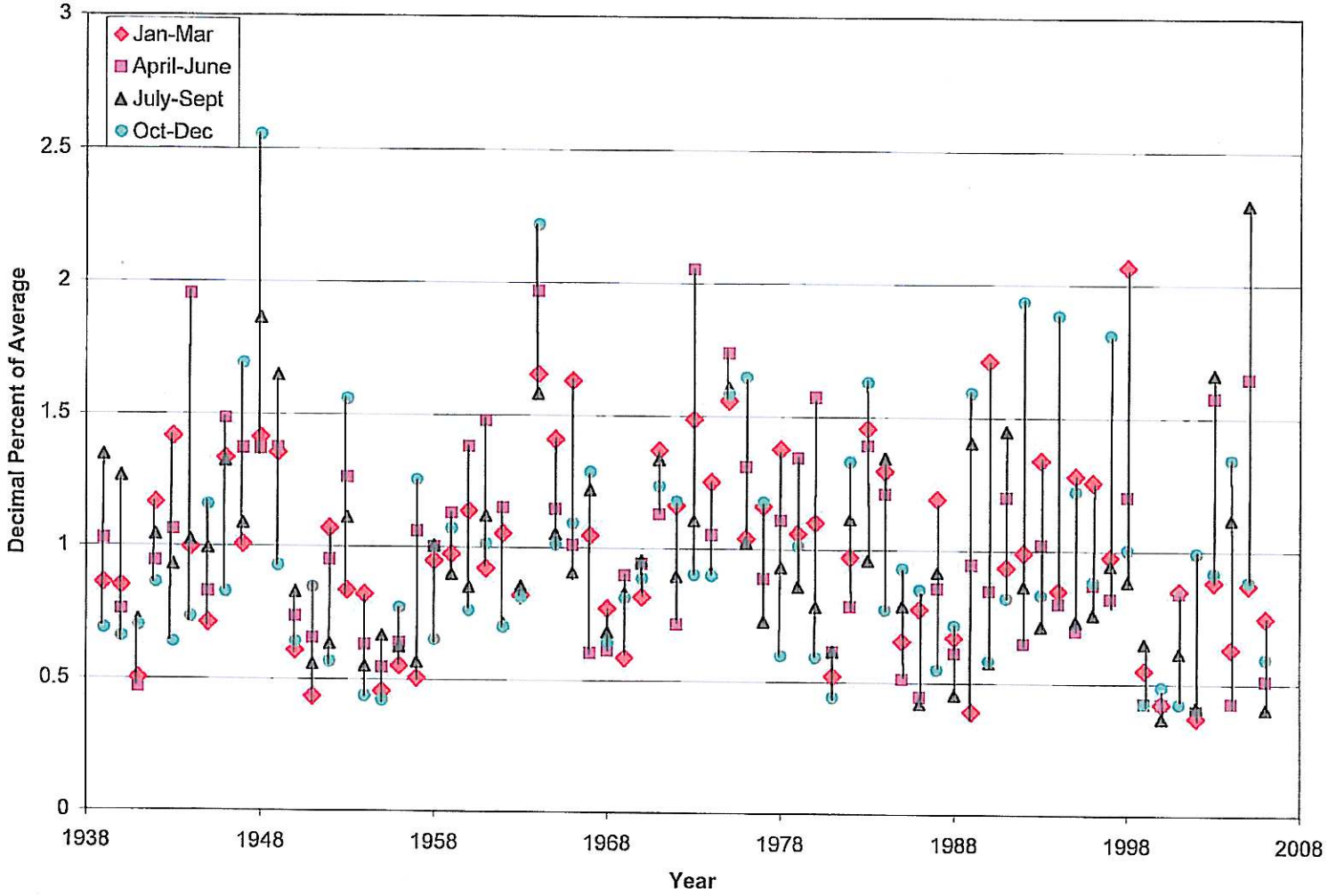

Figure 4-- Quarterly Flow at the Chattahoochee Gage by Year for 1939-2005
(Years when Jan-Mar flow is equal to or greater than 90% of average)

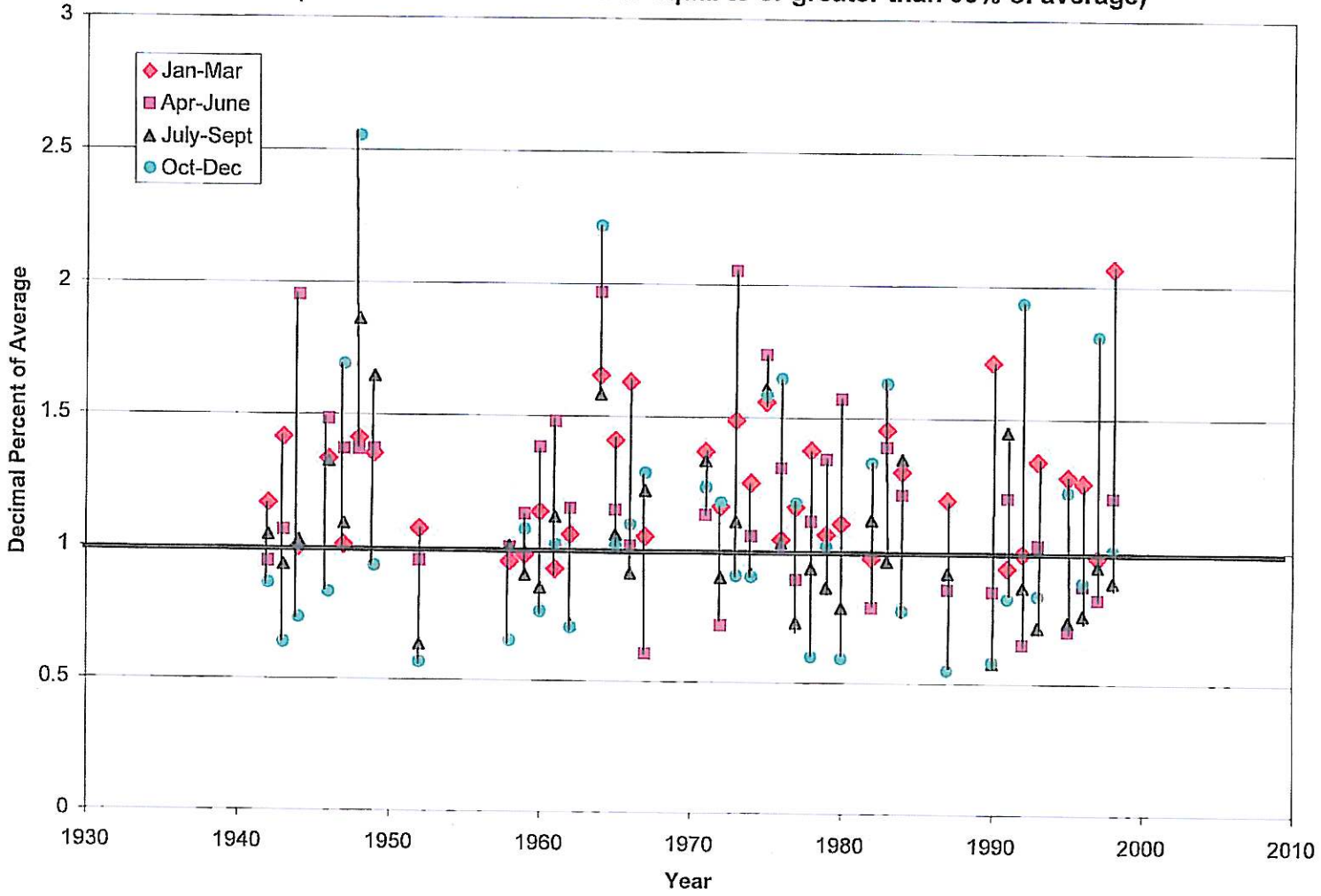

Figure 5--Quarterly Flow at the Chattahoochee Gage by Year for 1939-2005
(Years when Jan-March flow is 55% of Average or less)

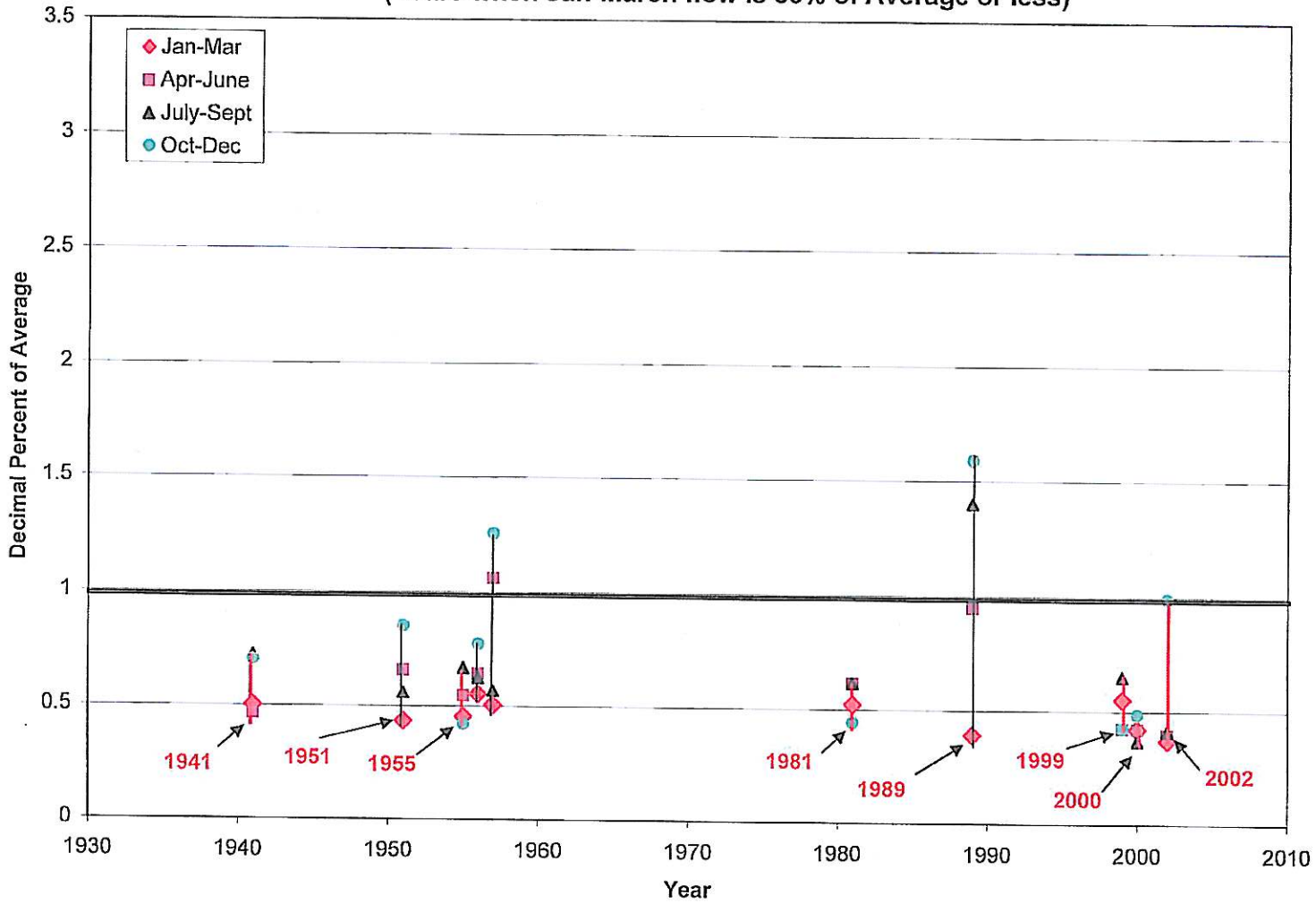

Figure 6--Quarterly Flow at the Chattahoochee Gage by Year for 1939-2005
Years when Jan-March Flow is 55% to 90% of average

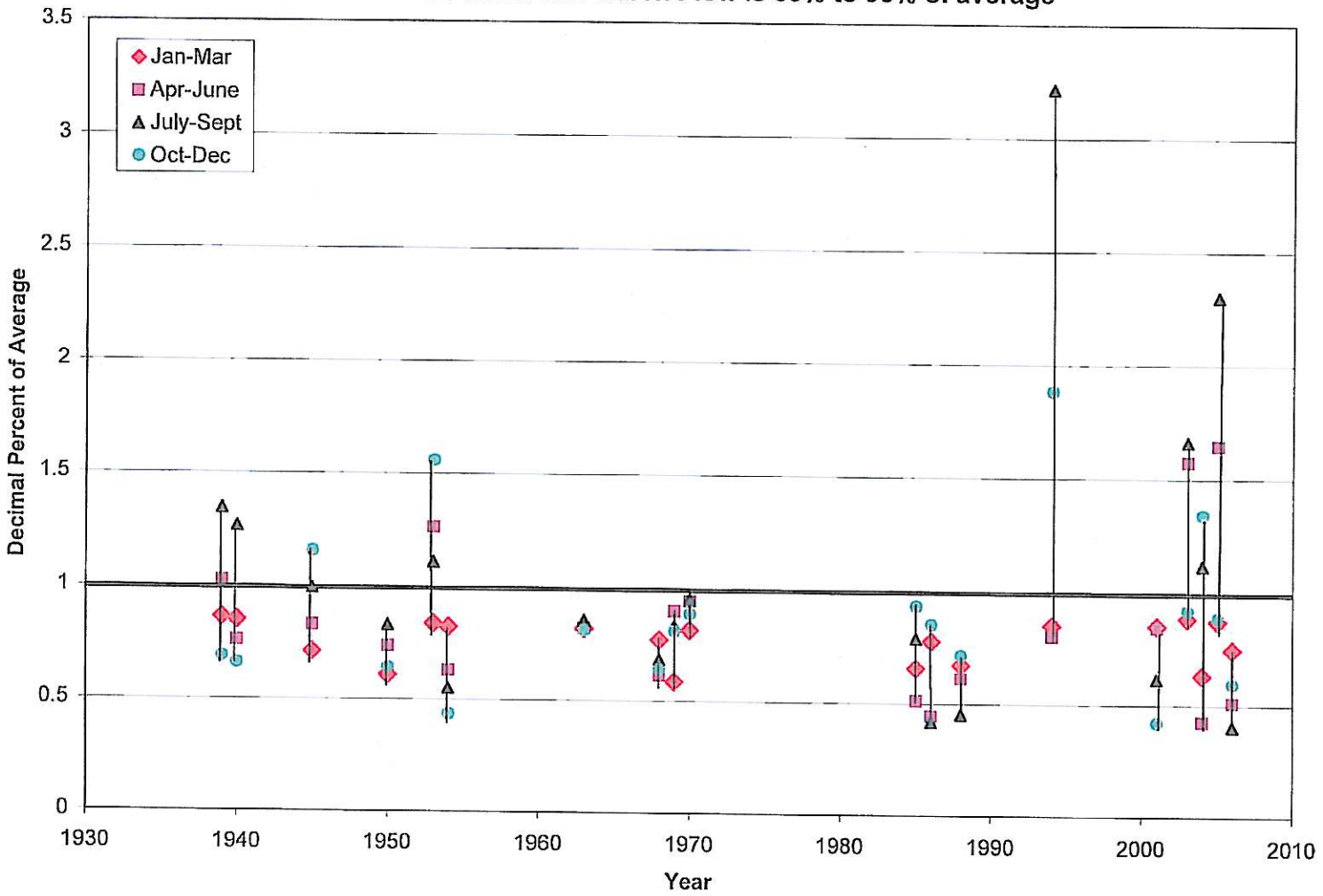

Figure 7--Quarterly Mean Elevations of Lake Lanier, 1960-2006

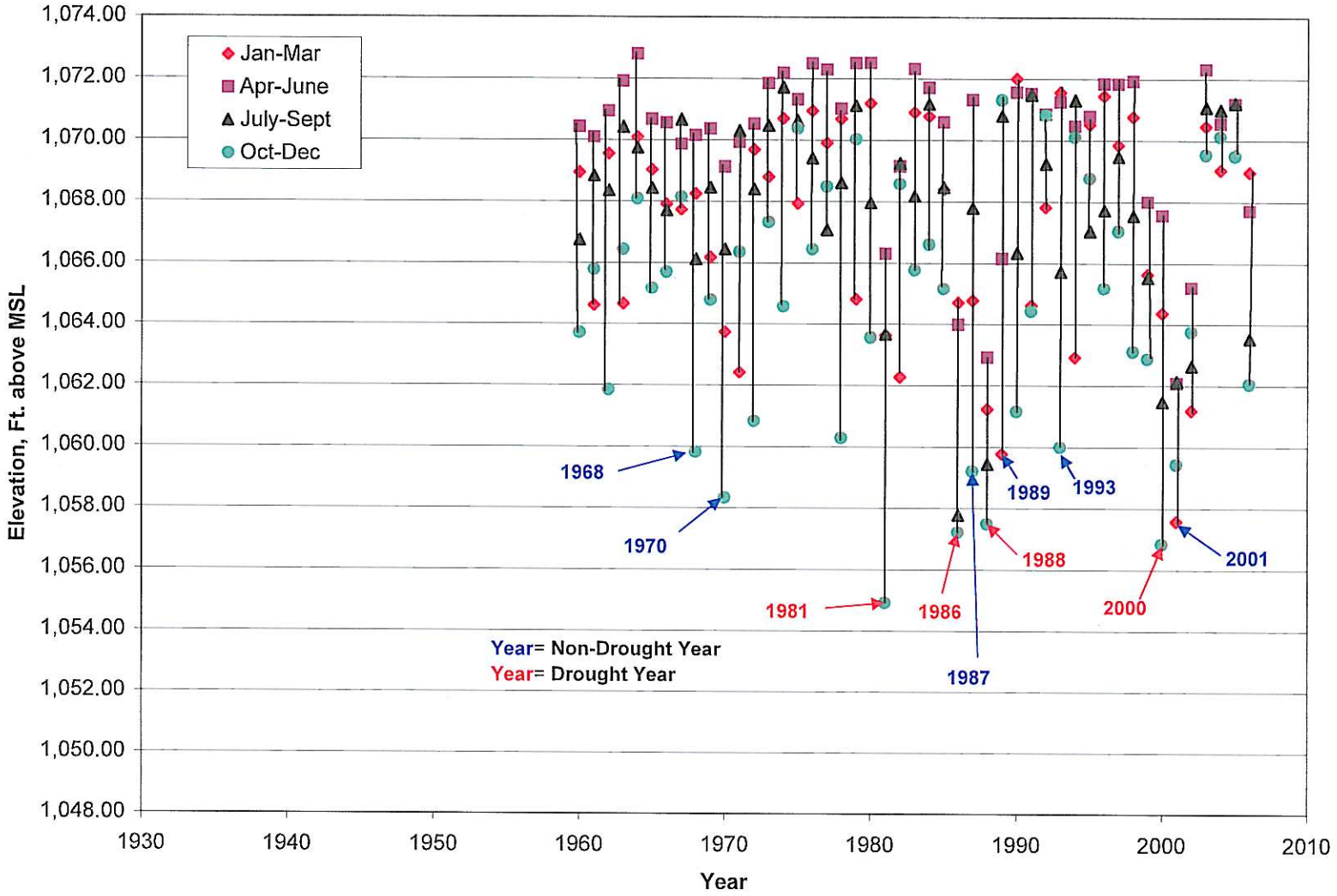

Figure 8--Simulated Daily Flows at the Chattahoochee Gage

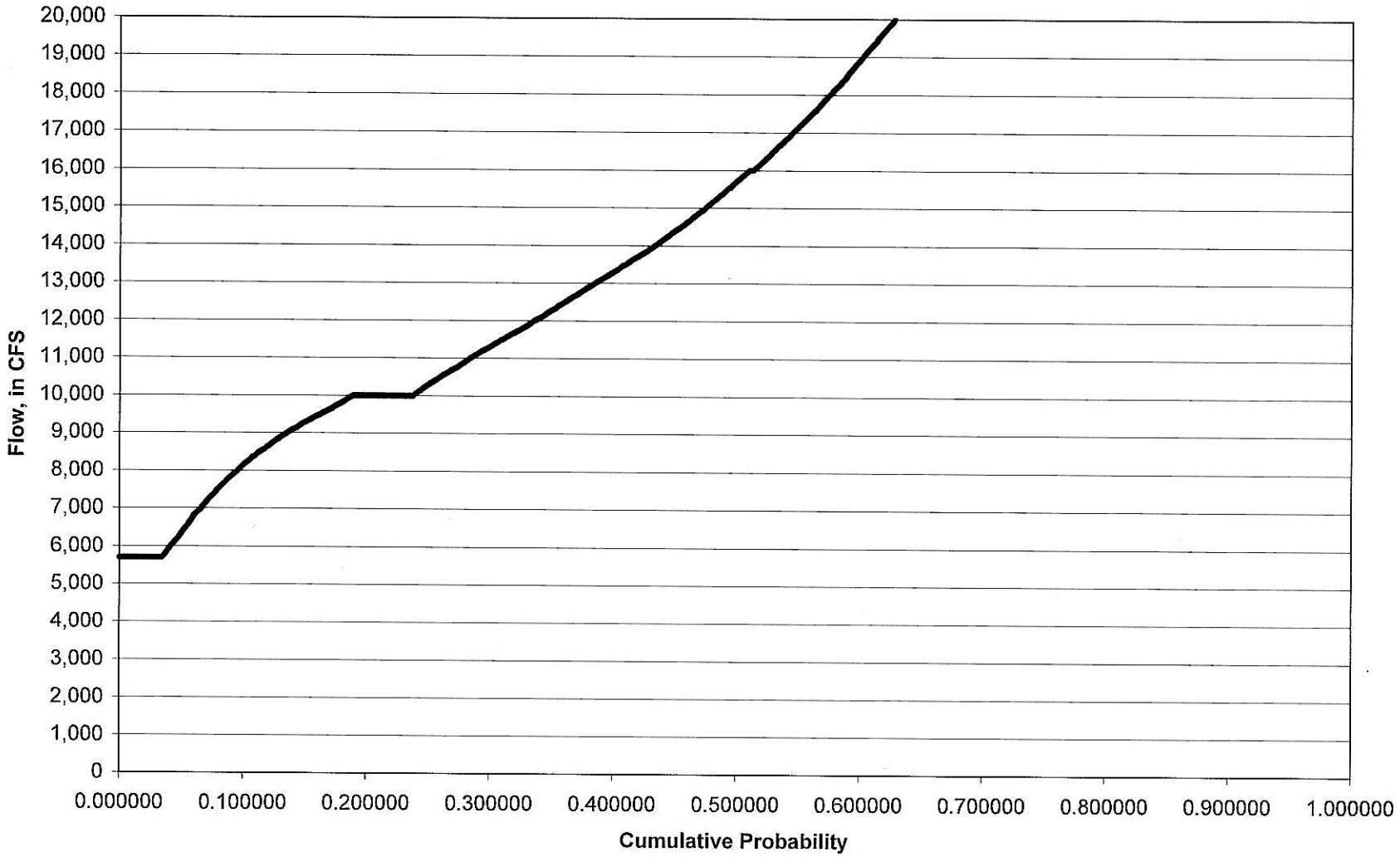

Figure 9--Simulated Elevation of Lake Lanier